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ULTIMATE FORMS OF GRANULATION TISSUE IN THE EAR.

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GRANULATION tissue, when developed in the middle ear or external auditory canal, usually follows, if left to itself, one of the following courses: —

First, it may continue to develop until, finally, by its size alone, it creates such alarming symptoms that the destruction of the mass becomes necessary. During the progress of its growth, only a portion of the cells — whatever their origin may be — go to build up tissue; the majority are cast off from the surface of the mass in the form of pus. A certain proportion of these masses will be found to possess, at a certain stage of their growth, a covering of skin or of mucous membrane, according to the locality in which they originate. Probably a large proportion of them, however, consist of simple granulation tissue without any covering of skin or mucous membrane.

Second, it may remain for an indefinite period of time in a condition of nearly absolute inactivity, so far as increase in size or apparent change in texture is concerned.

Third, it may be cast off from its nutrient base by the wasting away of its pedicle.

Fourth, it may assume one of the following ultimate forms or conditions: —

(a.) It may become covered with skin or mucous membrane, and remain in a quiet condition, like the adjacent normal tissues. The mass then simply represents a localized hypertrophy of the subcutaneous or submucous connective tissue, and in consistence is the same as or a little harder than the normal tissue.

(b.) It may become covered with skin and then undergo what I might call horny degeneration.

(c.) The mass may become covered with skin or mucous membrane, and its central portions undergo a change into true osseous tissue.

In the present paper, it is simply my purpose to place on record the histories of a few cases, which serve as illustrations of these ultimate forms of granulation tissue.

The simplest example of the first form is one in which a broad, flattened mass of granulations ceases all active growth, becomes covered with skin or mucous membrane, and remains, with more or less diminution in size, as a flattened, rounded knob or elevation in the external meatus or in the tympanum. Instances of this are so familiar to all aurists that it is unnecessary to say anything further regarding it in this place.

In regard to the last form, it would be difficult, particularly in this locality, to determine whether a real transition from granulation tissue to bone takes place, or whether simply the local irritation assumes a new phase, the cellular hyperplasia or formation of granulation tissue ceasing, and bone being formed instead. As the subcutaneous and submucous tissues in the ear are at the same time periosteal coverings, it is rather a matter of surprise that osseous formations are so rare.

The following case seems to have been one of the kind here referred to : —

CASE I. P. N., æt. 28, male, healthy. Nov. 1st, 1871. Otorrhœa from right ear since childhood. Five years ago Dr. Roosa, of this city, removed a polypus from the ear. Again, three years ago, Dr. R. was obliged to operate for the same trouble. At the present time the patient fears that another growth may have formed in the ear. On inspection the following condition of things is found: Two uniformly red, smooth, hemispherical masses, moistened with a moderate amount of pus, are visible in the right meatus. The outer one of the two is quite near the external orifice, and springs from the inferior and posterior wall of the meatus by a broad base. The deeper mass springs from the upper and anterior wall, and rests with its summit against the opposite tumor. These two growths, together with quite a small one, situated in the median line above, so encroach upon the calibre of the external meatus, that an ordinary silver probe can scarcely be made to penetrate beyond them. By Valsalva's experiment, pus can be forced through this narrow channel from within. By aid of a tenotomy

knife it is ascertained that these tumors are bony in their nature and covered by a very thin layer of skin. They are very slightly tender and possess very smooth surfaces. Discharge offensive in character. No complaint of pain.

In this case, after the removal of the polypus or mass of granulations, five and three years previously, the local irritation seems to have spent itself in the formation of bone, no signs of superficial proliferation of tissue being visible at the time I saw him.

With respect to the second change mentioned, the marked hardening or horny degeneration of the tissues, it is sometimes possible to follow out this transformation from the beginning to the end. So far as my own observation goes, the change occurs only in granulation tissue which springs from a surface of skin. The following cases are illustrations of this form : —

CASE II.* K. C., female, æt. 25. Aug. 30, 1871. Otorrhœa from left ear during the past three years. Examination reveals a fleshy mass protruding from the external meatus. Four distinct polypoid masses removed in succession with Blake's snare.

Sept. 6. Tendency to return. Snare again used and the stumps cauterized.

Sept. 23. Two of the stumps — situated opposite to each other, one on the upper, the other on the lower wall of the meatus — have coalesced so as to form a distinct pillar-like bridge of flesh from the upper to the lower wall of the meatus. Moderate pressure with the probe is insufficient to break the union. Purulent discharge now very slight.

Oct. 4. The column perceptibly diminishing in diameter; very little discharge.

Dec. 6. The fleshy column is now reduced to a slender fibrous cord, which feels like parchment when touched with the probe. Its diameter is nearly equal to that of the smallest violin string.

CASE III. L. H., female, æt. 26. Dec 1, 1873. More or less deaf since childhood. On the left side, history and appearance of chronic purulent inflammation of the middle ear. On the right side, the watch is heard only when pressed against the ear; no discharge since childhood. An examination with the speculum and reflected light reveals the following condition : Meatus normal. At the visible end of it is a smooth, parchment-like membrane of slight but uniform concavity outwardly. It has a semi-translucent appearance, with no evidence of being provided with vascular

* A case almost precisely like this will be found reported by Dr. Geo. T. Englemann in Vol. VI, page 203, of the "Archiv. für Ohrenheilkunde."

supply; is tough and decidedly thicker than the membrana tympani. When pressed against with the probe, it yields with a cracking, parchment-like sound, which is audible even to the by-stander. It is continuous with the skin of the meatus at all points, and might readily, upon superficial observation, be mistaken for the membrana tympani, did it not occupy a position somewhat too near the outer orifice, and were not the handle of the hammer wanting.

After a free crucial incision through this membrane, its distance from the plane in which the membrana tympani should lie was estimated to be about a line. The red and succulent mucous membrane of the promontory was all that could be seen beyond. As an evidence of the vitality of this false membrane, at the end of the examination a glistening border of bloody serum was noticed along the cut edges of the triangular flaps.

The improvement in the hearing, at least for conversation, was quite marked, while for the watch, it was increased to a distance of four inches.

At the next visit, a week later, the patient reported that there had been a constant discharge from the right ear since the day following the operation. The perforation was then circular in shape, at least three millimetres in diameter, and through it the relations of the deeper parts could be distinctly made out. It was thus ascertained that the handle of the hammer was still entire, though adherent to and covered up at its tip by the tissues of the promontory. The short process of this ossicle could be distinctly recognized at the inner edge of the base of the false membrane, now a simple constriction with sharply-cut edges.

When last seen the patient still complained of a slight muco-purulent discharge, and no marked change had taken place in the condition of the parts.

CASE IV. J. S., male, æt. 12, healthy, July 9th, 1873. Three years ago scarlet fever. Parents have never noticed any discharge from the ear (L), nor has the boy himself, until quite recently. An examination reveals the existence of a polypoid mass springing from the anterior upper portion of the meatus close to the outer orifice. After it had been removed with the snare there was brought to view a dark body, which proved afterwards to be a prune pit of moderate size. Neither the boy nor his parents could account for its presence in the ear. That portion of the meatus corresponding to the greatest breadth of the pit appeared to be dilated, while just beyond and just this side of it the soft parts of the canal seemed to be swollen. The patient returned nine days later. The inner end of the dilated region was then the seat of a ring-shaped mass of granulations, which encroached very considerably upon the calibre of the canal.

Patient returned again at the end of sixteen days (August 4th). The mass of granulations had then nearly obliterated the calibre of the canal at this point, distant not more than two lines from the membrana tympani. Crystals of chromic acid applied to the centre of the mass.

August 11th. Two repetitions of the caustic application since last note, the last being followed by pretty severe pain, requiring for its alleviation the application of leeches behind the ear.

August 2d. No discharge during the past few days. On examination the meatus is found to be entirely occluded by the growing together of the opposite surfaces of the annular constriction. The tissues are pretty firm, dry, and covered apparently by true skin. At one point, about in the centre of the *cul de sac*, there is a small scab, about the size of the head of an ordinary pin. After this had been torn off, the probe could readily be forced through to the broader passage beyond.

Efforts at dilatation were kept up for the following two or three days, but they caused considerable pain and proved of no avail.

August 28th. To-day the stricture will barely admit a small-sized probe. Applied to it fuming nitric acid, which caused only moderate pain.

October 4th. The single application of nitric acid resulted in a very marked enlargement of the constricted portion, and since then the contraction of the tissues has taken place in a centrifugal instead of a centripetal manner, as before.

October 25th. Continued enlargement of the calibre of the canal at the constricted portion. No treatment beyond simple syringing with luke-warm water.

November 22. Otorrhœa has entirely ceased. The meatus is nearly normal in size at the former seat of constriction. A small perforation in the central lower portion of the membrana tympani still remains.

Cases III and IV seem to me to throw light each upon the other. Until I had seen Case IV, and watched its rapid progress towards the formation of a false membrane, completely occluding the meatus, I was still puzzled to understand how the membrane in Case III had originated. On the other hand, I felt confident, while observing Case IV, that the process would surely lead to the same result as that observed in Case III, unless checked by active interference.*

The cases here narrated constitute in reality only one group of the second class (*b*) of ultimate forms. After the reading of the present paper, Dr. Clarence J. Blake of Boston gave the Society a brief account of several cases of horny growths, which had come under his notice. In these the tumors were really horny in character, resembling quite closely the cornua cutanea. To a still different group of this class belongs the case reported by me in the "Medical Record" for October, 1871, under the title of "Horny Growth of the Membrana Tympani."

* Since the meeting of the Society in Newport, I have learned from Dr. Francis Simrock of this city that he has already seen three cases very similar to Case III. In one of the three, the false membrane occluding the meatus occupied a position much nearer the external orifice than it did in the case which came under my notice.

